# Executive Summary of the Bay Area ITS Architecture

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## *1.0 Introduction*

**The Bay Area ITS Architecture** is the regional ITS plan for the San Francisco Bay Area. The Architecture was prepared under the direction of the Metropolitan Transportation Commission (MTC) based on input from a broad range of stakeholders. Its purpose is to facilitate ITS planning and to aid in ITS project development and procurement. **This document provides an overview of the San Francisco Bay Area's Intelligent Transportation System (ITS) Architecture.**

ITS refers to using communication technologies to improve transportation safety, operations, and efficiency. This definition encompasses a broad range of technologies and has created many opportunities for transportation professionals to respond proactively to increasing demand for effective transportation services. Many of these opportunities are predicated upon effective coordination between organizations, at both the institutional and technical level.

The Bay Area ITS Architecture along with its technical framework is one vehicle to facilitate coordination between organizations. The ITS Architecture represents a coordinated approach (over a ten-year horizon) to installing and operating technologies in the transportation system environment across jurisdictions in the Bay Area. It can be used to identify ITS deployment priorities, coordinate projects, and understand agency roles and responsibilities associated with ITS. The Architecture is based on a National ITS Architecture model sponsored by the USDOT. It is required for a region to be in compliance with the Transportation Equity Act for the 21st Century (TEA-21) and to remain eligible for federal funding.

The Bay Area ITS Architecture represents a revision to the 2004 Bay Area Regional ITS Plan (developed by Iteris, Inc., owned by MTC[1]) to include changes that have occurred over the last three to five years. The Architecture now includes security and emergency operations components and the goals are tied directly to the RTP. Additionally, while the content of many portions of the 2004 Plan remains in tact, the **2007 Architecture includes several major diversions**

[1] Portions of the 2004 Plan were reused where applicable.

**from the original. These changes vary significantly in content and approach not only from the 2004 version, but from other Plans/Architectures across the nation.** This approach encourages the use of this Architecture for actual project development:

-**The Architecture is project-based**, meaning that stakeholders access, understand, and use the Architecture (and corresponding RA) directly via project names and types; the previous version and examples across the nation use an entirely different organization of content based on predetermined types of systems; our approach encourages use of this Architecture for actual project development and coordination, thereby promoting systems that connect and share and minimize duplicating investments.

-**The Architecture uses laymen's terms**; The National ITS Architecture provides not only a framework but a vocabulary that has historically been extended to be used in Regional Architectures and ITS Plans. The Bay Area has altered the approach to ensure that, while providing full compliance with federal rules and policies, the Architecture avoids jargon, making the document more accessible by a variety of project sponsor staff, regardless of technical background or tenure in ITS/technology-based projects.


-**The Architecture is web-based**. It is not a paper report posted online, but a truly robust, organized and accessible web site that answers stakeholders' requests in an easy-to-browse manner.

***http://www.mtc.ca.gov/planning/ITS/***

The 2007 ITS Architecture can be used as a roadmap to integrated, complementary regional project investment in the San Francisco Bay Area, continuing our tradition of performance-based, coordinated programs. By referring to this document during project development, project sponsors can determine with whom to coordinate projects, where regional projects may be able to provide solutions to local agencies (thereby reducing potential duplication of spending), and how to move toward further sharing of information (through the use of regional standards).

## *2.0 Background*

ITS are a collection of communication and technology applications that are used to increase information to users of roadways and transit systems and make managing the assets and infrastructure more efficient and effective. Information technology can make transportation infrastructure more efficient at a fraction of the cost of infrastructure projects. The Bay Area ITS Plan covers the nine-county Bay Area, and addresses the needs and interests of stakeholders large and small within the region. **Nearly 300 projects have been mapped together** in this comprehensive outline to identify not only what is in place today but how to move toward the next generation of integration and effectiveness for the region. This means that we get more for less: more mobility, more air quality conformance, more efficient travel, at a lower, combined cost for our region.

In order to be eligible for federal funding (FHWA or FTA, any Highway Trust Funds), projects must be consistent with the regional ITS architecture. In order to accommodate this requirement and assist project sponsors in quickly and thoroughly understanding what that means to their projects, the Architecture has been developed to address project specifics in two different ways:

**Find a Specific Project**

The first way is to look up your project by the name of the sponsoring public agency (such as BART, Caltrans, or the City of San Jose) or search by category of projects (such as Transit Information or Toll Management). From there you can quickly jump to diagram(s) that represent that project in relation to other projects and agencies in the area. This provides the benefit of showing a project sponsor, at a glance, how their projects connect with others in the Bay Area now and in the future. More detailed information is available as well, by traversing the web-based Architecture in more detail.

**Find a Type of Project**
If a project is not listed by name, it may still conform to the Regional ITS Architecture. The Bay Area 2007 ITS Architecture is specifically designed to address the long-term potential for integrated and coordinated technologies in addition to what is happening today. So in addition to documenting how planned and existing projects can and do fit together, the Architecture shows how future projects can be coordinated. Specific guidelines are provided to walk project sponsors through finding where their projects are in the architecture (for federal regulations requiring conformance with the regional ITS architecture) and how to use different parts of the Architecture toward project planning and design if desired.

## *3.0 The ITS Architecture in Support of Regional Goals and Objectives*

The ITS Architecture directly supports the goals of the RTP (Transportation 2035); ITS is not separate and distinct from transportation, but rather the converse: technology is just one of the many tools available to transportation professionals in guiding our investment decisions into the future.

**TRANSPORTATION 2035 PLAN - GOALS**

1. *Safety*
2. *Security*
3. *Reliability*
4. *Efficient Freight Travel*
5. *Clean Air*
6. *Climate Protection*
7. *Equity*
8. *Livable Communities*

The deployment of ITS supports the 2035 Transportation Plan goals by providing new and innovative solutions to regional transportation problems, especially in the areas of safety, security, and reliability. Effective consideration of these regional ITS goals in particular has positive, enabling affects on achievement of the remaining RTP goals as well.

## *4.0 Stakeholder Roles and Responsibilities*

Champions from cities, counties, law enforcement, MTC, Caltrans, transit agencies, CMA's, and special purpose agencies round out the list of stakeholders, large and small, who have had input to the development of the Architecture. The Architecture illuminates critical relationships among these agencies from an operational standpoint, with a special emphasis on the information and infrastructure that is produced and shared. A subset of

stakeholders comprises the Architecture Maintenance Committee, which is responsible for ensuring that the ITS Plan remains current through addenda.

## *5.0 Technical Detail*

The overall purpose of the Architecture is to establish how the projects interact. The technical detail provides such information as what standards and interfaces can move the region toward greater integration, and to depict, for the benefit of project sponsors, which other projects and agencies might be connected in the future. Future integration emphasis for Bay Area agencies should promote connectivity to and build-out of large regional and sub-regional projects. These projects, such as the center-to-center project and the smart corridors like SFGo and I-580, provide regional data sharing and help to realize the maximum potential of previous and ongoing investment. This technical detail is helpful to project sponsors to this end in that they can, at a glance, understand which potential partners or agencies they can be coordinating with and provides details supporting connections and standards.

While nearly 300 projects are listed by name in the Architecture, an emphasis is placed on the large-scale, regional and sub-regional projects that most require and promote connectivity and coordination. These projects are addressed in a similar manner as all other projects in the documentation and in addition include, where applicable, further diagrams and details that show relationships for partner agencies and provide further guidance for connecting with these systems. For example, 511 is so mature in its development that it is actually represented by four different projects in the Regional ITS Architecture. An additional high-level diagram is also included that shows how these four components fit together to comprise the full program. Another example is that the actual functional requirements are provided for the Center-to-Center project. This would allow an agency planning to share data in the region to review these functions and determine whether the existing, regional center-to-center project would fit their needs. This can have the result of reducing duplication of expenditure on data sharing activities in the region, thereby further capitalizing on regional investment.

The major regional/sub-regional projects emphasized in the Architecture include:

- Smart Corridors: SFgo, SVITS, East Bay Smart Corridor, I-680, I-580, I-880
- 511: 511 Traffic Information, 511 Real Time Transit Information, 511 Transit Information, 511 Rideshare/Bicycle Information

- Center-to-Center Communication
- Translink
- HOT Lanes

## *6.0 Policy Issues*

Throughout the development of the Architecture, there were several key policy-level issues that arose in discussions with the stakeholders. These issues focused on priorities, direction, and other potential policy considerations that the stakeholders believe should be considered at a regional level. They concern primarily overlapping projects, services, and opportunities on a regional level as well as region-wide issues including resource shortfalls. The issues summarized in the "Policy Issues from the Bay Area Intelligent Transportation Systems (ITS) Architecture" are:

- Duplication of ITS Services and Efforts
- Proprietary Software
- Operations and Maintenance Funding
- Integration
- Training Opportunities to Improve Professional Development
- ITS Advocacy to Promote Funding
- Data Sharing

These issues will be discussed in the appropriate task force or committee responsible for the specific aspect of policy development. MTC will take the lead to promote further discussion about potential solutions to these issues.

## *7.0 What's Next?*

As we close 2007 with the Bay Area ITS Architecture in place, we look ahead at future updates to this document, meant to guide future integration and inform policy guiding ITS deployment and funding in the region. Federal regulations (as documented in the Federal Register) mandate that the region "…develop and implement procedures and responsibilities for maintaining [the regional ITS architecture]." It is in the purview of the Bay Area's ITS stakeholders to identify a structure and a means for doing so. A challenge to this end is that no agency is well resourced to support a significant focus on the Regional ITS Architecture. The plan for keeping up the Bay Area ITS Architecture into the future includes 2 primary components:

1. A Maintenance Committee, consisting of representatives from each geographic and modal subset of the region, will continue to advise MTC on the ongoing upkeep of the document. The Committee will meet quarterly (as needed) to provide the consensus component to major and minor changes as suggested by project sponsors in the area. Recommended changes will be kept as a separate addendum to the architecture. This effort will continue to be organized and informed by an MTC consultant.

2. The Maintenance Committee will advise MTC on issues that impact the architecture especially in areas of near-term (next 5 years) technology growth or major shifts in project development in the region. Based on this feedback, MTC will determine if there's a need to focus on a particular ITS-related issue and/or perform a targeted update to the architecture. This approach would reduce the burden of frequently updating all sections of the document and potentially free up resources to focus on more strategic topics. This approach requires MTC to continue its oversight and management role for regional architecture work.